

Appl. No. 10/801,168
Amendment Dated October 31, 2006
Reply to Office Action of September 15, 2006

In the Claims:

Claim 1 (Currently Amended). An apparatus for creating therapeutic charge transfer in tissue, comprising a coil generating a changing magnetic field to induct an electric field in the tissue exceeding ~~10~~ 1 mV/cm when said coil is 5 cm from the tissue.

Claim 2 (Original). The apparatus according to claim 1, wherein said magnetic field is saw-tooth shaped.

Claim 3 (Original). The apparatus according to claim 2, wherein said magnetic field has a growth phase and a decay phase, a duration of said growth phase being at least ten times a duration of said decay phase.

Claim 4 (Original). The apparatus according to claim 3, further comprising a control circuit controlling a current fed to said coil, said control circuit including two subcircuits and a switch for switching between a first of said subcircuits and a second of said subcircuits, said first of said subcircuits causing said growth phase, said second of said subcircuits causing said decay phase.

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Claim 5 (Original). The apparatus according to claim 4, wherein:

each one of said subcircuits has a respective λ equaling an inductance (L) divided by a resistance (R) of said respective one of said subcircuits; and

said λ of said second subcircuit is at least ten times said λ of said first subcircuit.

Claim 6 (Original). The apparatus according to claim 4, wherein said first subcircuits has a λ no greater than 1, λ being calculated by dividing a resistance (R) of said first subcircuit by an inductance (L) of said first subcircuit.

Claim 7 (Original). The apparatus according to claim 4, wherein said second subcircuit has a λ no less than 10, λ being calculated by dividing a resistance (R) of said second subcircuit by an inductance (L) of said second subcircuit.

Claim 8 (Original). The apparatus according to claim 4, wherein said second subcircuit includes an IGBT for increasing a resistance of said second subcircuit.

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Claim 9 (Currently Amended). The apparatus according to claim 1, wherein said coil is configured to receive a ~~current~~ voltage exceeding 2000 V.

Claim 10 (Original). The apparatus according to claim 1, wherein said coil has a duty cycle of at least ten percent.

Claim 11 (Original). The apparatus according to claim 10, wherein said coil has a duty cycle of at least eighty percent.

Claim 12 (Original). The apparatus according to claim 1, wherein said coil is liquid cooled.

Claim 13 (Original). The apparatus according to claim 12, wherein said coil is cylindrical and has an inner channel and an outer channel through which coolant can be passed to cool said coil.

Claim 14 (Original). The apparatus according to claim 1, wherein said magnetic field has an asymmetric waveform.

Claim 15 (New). The apparatus according to claim 1, wherein said coil generates a changing magnetic field to induct an

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electric field in the tissue exceeding 10 mV/cm when said coil is 5 cm from the tissue.

Claim 16 (New). A method for magnetically inducting an electrical field in tissue to create therapeutic charge transfer in the tissue, which comprises:

providing an apparatus according to claim 1;

increasing the magnetic field in said coil to induct an electrical field having a first direction in the tissue for a first period of time; and

decreasing the magnetic field to induct an electrical field having a second direction opposite said first direction in the tissue for a second period time, the second period of time being different than said first period of time.

Claim 17 (New). The method according to claim 16, wherein the first period of time is longer time than the second period of time.

Claim 18 (New). The method according to claim 16, which further comprises repeating the increasing step and the decreasing step.

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Claim 19 (New). The method according to claim 16, wherein:

the increasing of said magnetic field occurs linearly over time;
and

the decreasing of said magnetic field occurs linearly over time.

Claim 20 (New). The method according to claim 16, wherein the increasing and the decreasing of said magnetic field has a saw-tooth shaped intensity over time, wherein said saw-tooth shaped intensity increases linearly and decreases linearly.

Claim 21 (New). The method according to claim 16, wherein said first period of time is at least five times as long as said second period of time.

Claim 22 (New). The method according to claim 16, wherein the increasing of said magnetic field includes increasing said magnetic field at a sufficient rate so that said electric field in the tissue is at least 1 mV/cm.

Claim 23 (New). The method according to claim 16, wherein the increasing of said magnetic field includes increasing said magnetic field steadily so that said electric field varies less

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than 10% in intensity for at least 90% of said first period of time.

Claim 24 (New). The method according to claim 17, which further comprises minimizing said second period of time.

Claim 25 (New). The method according to claim 16, which further comprises:

repeating the increasing and the decreasing steps in alternating order;

defining a duty cycle as said first time period divided by a sum of said first and second time period; and

maintaining said duty cycle to at least sixty-three percent.

Claim 26 (New). The method according to claim 16, which further comprises:

creating an ionic charge transfer in the tissue in a first direction during the increasing step; and

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creating an ionic charge transfer in the tissue in a second direction opposite said first direction during the decreasing step; and

controlling a rate of change of said magnetic field and duration of the increasing step and the decreasing step so that said charge transfer in said second direction is no more than half said charge transfer in said first direction.

Claim 27 (New). The method according to claim 16, which further comprises:

creating said magnetic field in a coil;

connecting said coil to an increase subcircuit that feeds current to said coil during the increasing step; and

connecting said coil to a decrease subcircuit that robs current from said coil during the decreasing step.

Claim 28 (New). The method according to claim 27, which further comprises:

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interconnecting said coil and said increase subcircuit with an IGBT; and

interconnecting said coil and said decrease subcircuit with said IGBT.

Claim 29 (New). The method according to claim 28, wherein said IGBT has a stand-off voltage of at least two thousand volts.

Claim 30 (New). The method according to claim 27, which further comprises:

passing an electrical current through said coil to create said magnetic field; and

during the increasing step, raising said electrical current to at least one thousand watts.